

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method of optimizing the layout of a microdevice to be created by a photolithographic process, comprising the acts of:

storing a microdevice layout in a hierarchical database having a number of levels, each level including definitions of polygons corresponding to features in the microdevice, each polygon being defined as a number of vertices;

analyzing interacting polygons in the database;

promoting polygons or portions thereof such that polygons that interact are defined on the same hierarchical level of the database;

fragmenting the polygons in a level of the database containing any promoted polygons so that the vertices that define each polygon are optimized for the application of a tool for resolution enhancement techniques (RET); and

applying the RET tool to the layout.

2. The method of Claim 1, additionally comprising:

fragmenting a portion of the layout for the application of an RET prior to the step of analyzing the interacting polygons.

3. The method of Claim 1, wherein the act of promoting polygons includes:

defining a copy of a polygon or portion thereof in another database level containing an interacting polygon without altering the fragmentation of the polygons in the level from which the promotions are made.

4. The method of Claim 1, in which the promoted portions of polygons are edge segments.

5. The method of Claim 4, further comprising:

keeping a record of which edge segments in a database level have had copies promoted to another hierarchy level.

6. The method of Claim 4, further comprising:

keeping a record of which edge segments in a database level have been promoted from another hierarchy level.

7. A method of performing optical and process correction (OPC) in a hierarchical database defining a microdevice to be manufactured lithographically, comprising acts of:

fragmenting polygons in the levels of the hierarchical database so that each polygon is optimized for OPC;

selectively promoting interacting polygons or portions thereof such that interacting polygons are defined on the same database level, wherein said selective promotion does not affect fragmentation of the polygons or portions thereof that are promoted;

refragmenting the polygons and any promoted polygons or portions thereof for the application of an OPC tool; and

applying the OPC tool.

8. The method of Claim 7, in which the promoted portions of polygons are edge segments.

9. The method of Claim 7, in which the OPC tool is applied using parallel processing.

10. A method of performing optical and process correction (OPC) on a hierarchical database defining a microdevice to be manufactured lithographically, comprising:

selectively promoting copies of polygons or portions thereof in the database such that interacting polygons or portions thereof are defined in the same database level;

fragmenting polygons defined in a level of the hierarchical database including any promoted polygons or portions thereof for the application of an OPC tool; and

applying the OPC tool to the fragmented database levels.

11. The method of Claim 10, in which the promoted portions of polygons are edge segments.

12. The method of Claim 11, in which the OPC tool is applied using parallel processing.

13. In a hierarchical database of the type that defines a number of polygons each of which is made up of edge segments, a method for preparing the database for the application of a resolution enhancement technique, comprising:

determining an interaction region of each polygon in the database;

combining the polygons of a level with any promoted edge segments or portions thereof;

fragmenting the edge segments of a level including promoted edge segments or portions thereof;

calculating changes to the fragmented edge segments by the resolution enhancement technique;

determining if an edge segment interacts with a polygon on another level of the database and, if so, promoting the edge segment; and

altering the polygons of a level in a manner determined by the resolution enhancement tool if the edge segments of a polygon do not interact with a polygon on another level.

14. The method of Claim 13, further comprising:

determining neighboring edge segments that interact with an interacting edge segment and promoting the neighboring edge segments to the same level as the level to which the interacting edge segments are promoted.

15. The method of Claim 14, wherein any changes to the neighboring edge segments as determined by the resolution enhancement tool are also promoted.

16. The method of Claim 14, wherein the fragmentation of a neighboring edge segment is not changed in a level to which it is promoted prior to the application of the resolution enhancement tool.

17. A computer readable media on which is stored a number of instructions that when implemented by a computer system cause the computer system to perform the acts of:

storing a microdevice layout in a hierarchical database having a number of levels, each level including definitions of polygons corresponding to features in the microdevice, each polygon being defined as a number of vertices;

analyzing interacting polygons in the database and promoting polygons such that polygons that interact are defined on the same level of the database;

fragmenting the polygons including promoted polygons in a level of the database including any promoted polygons or portions thereof so that the vertices that define each polygon are optimized for the application of a tool for resolution enhancement;

applying the resolution enhancement tool to the optimized polygons in the levels of the database to make adjustments to the polygons to optimize the layout of the microdevice.

18. A computer readable media on which is stored a number of instructions that when implemented by a computer system cause the computer system to perform the acts of:

selectively promoting interacting polygons or portions thereof such that interacting polygons are defined on the same database level, wherein said selective promotion does not affect the fragmentation of the polygons having portions that are promoted;

fragmenting definitions of polygons including any promoted polygons in the levels of the hierarchical database so that each polygon is optimized for OPC; and

applying the OPC tool to the polygons in the database levels.

19. The computer readable media of Claim 18, wherein the instructions cause the computer system to perform the acts on multiple processors.

20. A computer readable media on which is stored a number of instructions that when implemented by a computer system cause the computer system to perform the acts of:

fragmenting polygons in a level for the application of an optical and process correction (OPC) tool;

selectively promoting copies of polygons in the database such that interacting polygons or portions thereof are defined in the same database level, wherein the selective promotion does not alter the fragmentation of the polygons optimized for OPC;

fragmenting polygons and any promoted polygons defined in levels of the hierarchical database for the application of an OPC tool; and

applying the OPC tool to the database levels.

21. The computer readable media of Claim 20, wherein the instructions cause the computer system to perform the acts on two or more processors.

22. A method of optimizing a layout of a device to be made lithographically, comprising:

storing a representation of the device in a hierarchical database, each level of the database having a number of polygons defined therein, each polygon comprising a number of edge segments;

selectively promoting edge segments that are within an interaction distance of a feature to the same database level as the feature;

fragmenting the polygons in each database level for the application of an RET tool;

applying the RET tool to each level of the database.

23. The method of Claim 22, wherein the RET tool is an OPC tool.

24. The method of Claim 22, in which the application of the RET tool is done using parallel processing.

25. The method of Claim 22, additionally comprising:

fragmenting the representation of the device in a manner optimized for the application of an RET tool prior to the step of selectively promoting edge segments.

26. The method of Claim 22, wherein the promotion makes copies of the promoted edge segments in another level and a record is made of which edge segments are promoted.

27. A method of analyzing a database for the application of a resolution enhancement technique including:

promoting polygons or portions thereof that are stored in a level of the database to the same level as the polygons or portions thereof with which they interact;

keeping a record associated with each polygon or portion thereof that stores data regarding the polygon or portion thereof, wherein said record allows identical knowledge of the polygon or portion thereof at all levels in the database.